Electrical installation

Contents Page

Technical Data for Maintenance Service

Electronic SCR Drive Control (puise controi system)	Stilltronic R70
Accelerator pedal control transmitter	potentiometer
Angle of rotation sensor, hydraulics	potentiometer
Current draw:	
Start	approx.. 160 A / 400 rpm
Drive motor field excitation	12 ---35 A
Generator field excitation	12 --- 15 A (40A)
Current limit/armature current	460 A max.
Travel speed	adjustable up to 22 km/h max.
Travel speed reduction	optional equipment
Electrical braking	rate of braking power can be selected by means of a 5-stage rotary switch
Contactors 1K3, 1K4	12 Volt (5,06 ohms)
Fuses for	
- power board	1F3 — 60 A (LET)
- Master board	1F11, 1F14, 1F15 — 1 A
	1F12 — 10 A
	4F1 — 10 A
	6F1, 9F1 — 5 A
- Pc.b. 9A2 diesel engine shut down controller	1F17 — 5 A
- Pc.b. A7 control circuit fuse	1F21 — 10 A
	1F16 — 15 A
	1F18 , 1F19, 1F20 — 20 A
- Contactor control panel A 5	9F4 —250 A
	F2 , F5 — 20 A
	F3 , F4 — 1 A
	F6 — 30 A
Alternator 9G2	28 volts / 55 A
Starter batteries Gl, G2	2 batteries, 43Ah — 210A (VW -/ MB-Motor)
Starter batteries Gl, G2	2 batteries, 48Ah — 320A (DEUTZ-Motor)
Excitation generator/ motor field	transistorized 24-volt power section
Electronic rpm regulation, engine	TFG (LPG): throttle positioning solenoid
	DFG (Diesel): servomotor for injection pump
	DFG : EMR / DEUTZ-Motor
Insulation resistance	
Electrical equipment (motor/generator circuit)	1000 ohms/ volt — approx. 190 kohms
Electrical machines	1000 ohms/ volt — approx. 190 kohms
Electrical protection, construction complying with DIN 40050	
Electrical equipement: IP 54	

Electrical installation

Mechanical configuration

The electrical installation is composed of two main sections.

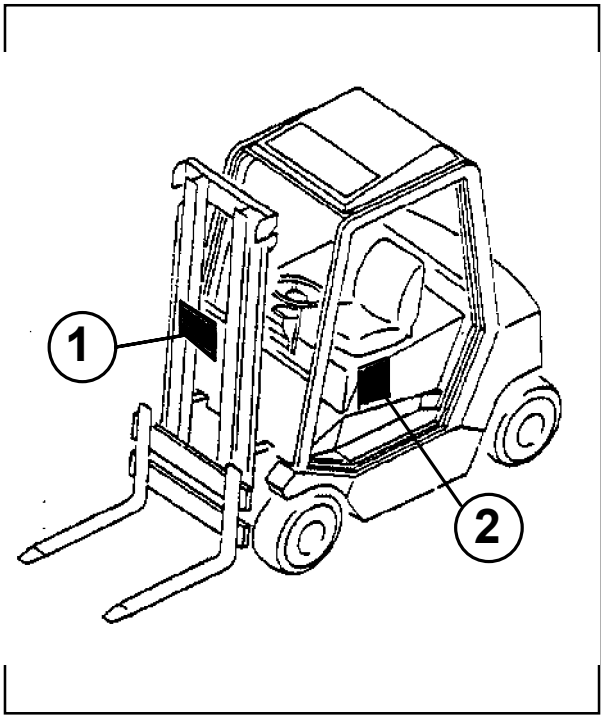
1 The **SCR control equipment** is mounted to the front cowling on the RH side. It consists of:

- **power board - P.C.b.**
- drive control - p.c. b.
- engine starting via generator - p.c. b.
- throttle positioning solenoid (TFG=LPG model)
- p.c.b.- servomotor (DFG=diesel model)
- p.c. b.- electronic charge compensating/ balancing device (TI'G=LPG model)
- p.c.b.- shut-down solenoid (DFG=diesel model)
- p.c.b.- control circuit fuse ffG=LPG model)

- **Master Board** (base plate)

2 Protected by a cover, the **contactor panel** is located on the LH side and is accessible from unter the engine bonnet. Mounted on the contactor panel are:

- **contactor,** driving	1 K4
- **contactor,** starting	1 K3
- **p.c.b. with current sensor**	1A6/1 U1
- **glow plug relay** (DFG=diesel model)	9K3



The components listed below also belong to the electrical installation (see illustration page 4)

A. Dash panel comprising

3	keyswitch	S1
4	directional control switch for fwd - neutral - rev.	1S1
5	hour meter	6P1
6	5-stage switch various indicator lights	1S14
7	horn button in the steering wheelhub	4S1

B. Within the front cowl arealleg

compartment:

1	electronic contro! unit	A4
8	accelerator pedal control transmitter (floor plate)	1B1
9	brake switch (front cowling, LH side)	1S12
10	warning horn (front cowling, LH side)	4H1

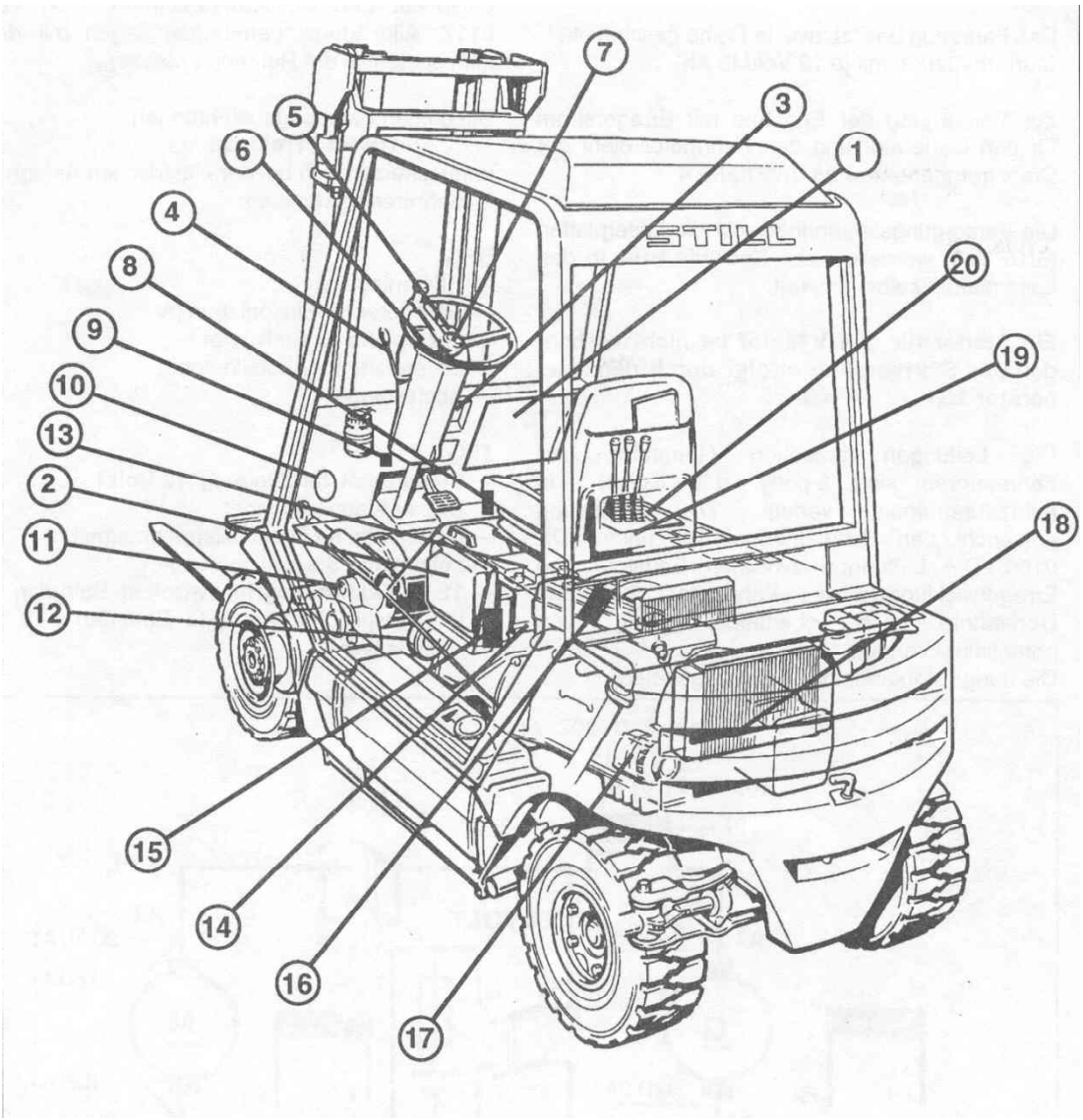
C. Drive motor/Generator

	- brush wear monitoring	
11	tachogenerator	6B7
12	rpm sensor	6B9

D. Under the engine bonnet

13	starter batteries	G1/G2
14	servomotor for injection pump (DFG=diesel model)	9M7
2	contactor panel '	A5
15	ignition system (7G=LPG model)	
16	throttle positioning solenoid (TFG=L13G model)	9Y3
17	alternator	9G2
18	preheat resistor (DFG=diesel model)	9R8
19	shut-down solenoid	9Y5
20	angle of rotation sensor, hydraulics	2R2
21	parking brake switch	1S4

Electrical installation



Electrical installation

General Description

Electrical supply is by means of two 12-volt/43 Ah starter batteries which are wired in series.

The 28-volt/10/55 alternator supplies exciting current to the power board for generator and drive motor.

The supply voltage for the printed circuit boards (5/15 volts) is generated in the power board and the printed circuit board respectively.

There does not exist an electric starter as generator «IGII is the means of starting the engîne.

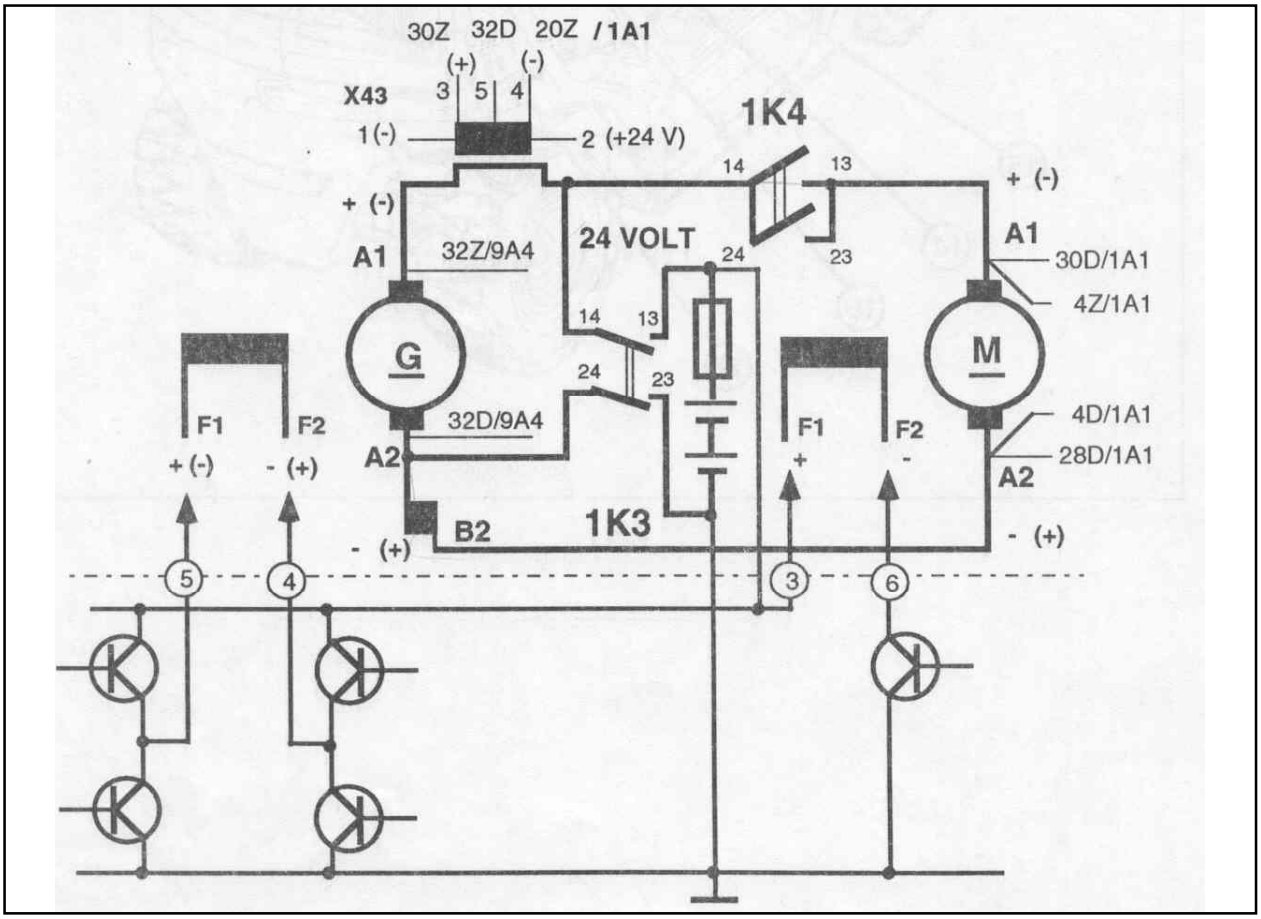
Connections between d.c. generator and drive motor are the bipolar type, Le. they are completely isolated electrically from truck frame. Wiring conforms to VDE 0100 standards. Also of the bipolar type, the electrical connections between power board and excitation windings of drive motors and generator are not grounded. The remaining wiring is of the unipolar type.

Routing ot truck cables meets VDE 0117 requirements. All control voltages are with negative against the body (frame).

There are differences in the electrical system o **diesel and LPG powered** models, viz.:

DM (diesel model)
- glow plug system
- servomotor for injection pump
- p.c.b. for servomotor
- p.c.b. for shut-down solenoîd
- shut-down solenoid

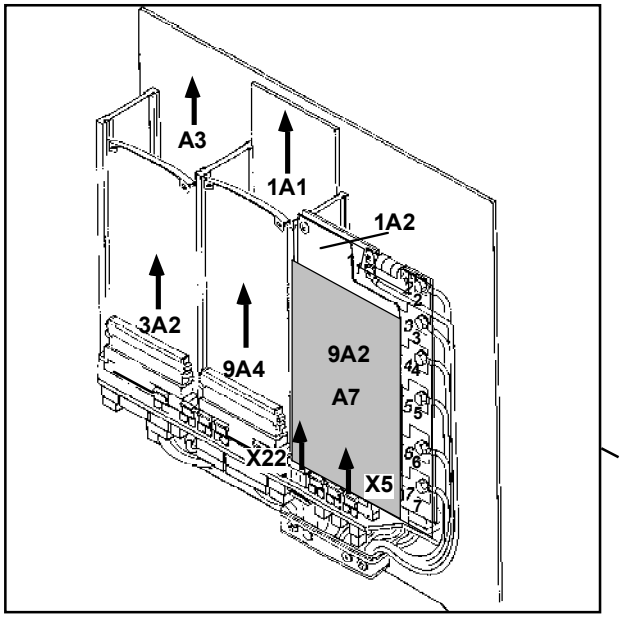
TFG (LPG model)
- control unit for **12-volt** ignition system!
- throttle positioning solenoid
- p.c.b. for throttle positioning solenoid
- p.c.b. for control circuit fuses
- **12-volt central tapping** between batteries
- charge balancing/compensating circuit for batteries
- shut-off valve



Insulation test

Preparation for testing

Before carrying out test: Disconnect or rernove all printed circuit boards incorporated in electronic control unit, and then disconnect connectors
X5 (power board lA2) and
X22 (p.c.b. 9A2 diesel engine shut down controller/p.c.b. A7 control circuit fuse).



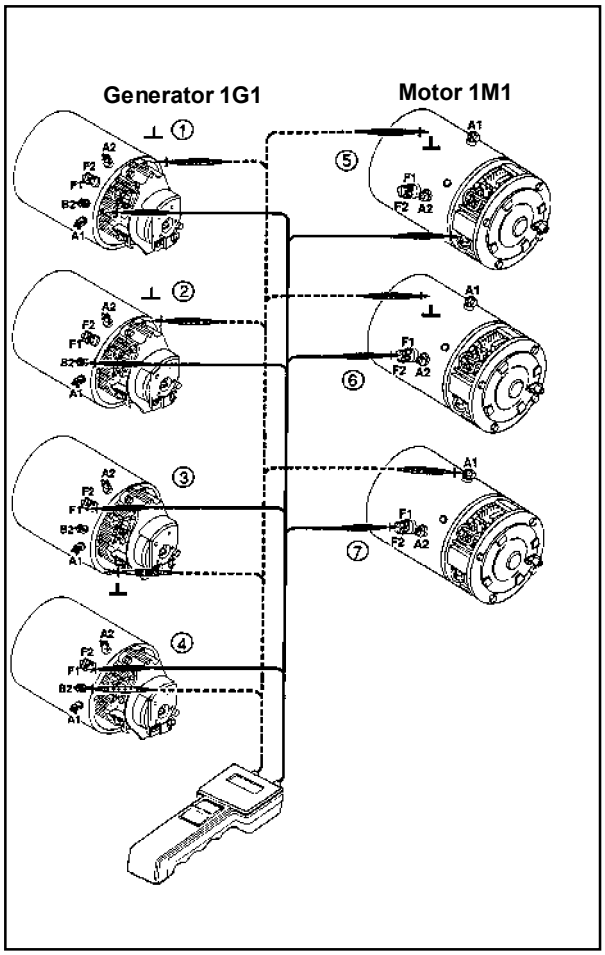
Testing the insulation resistance (earthing)

After any repair work on electric components on contactor panel and/or electrical machines (generator/ drive motor) it will be necessary to test the insulation resistance before installation or putting the truck back into service again.

The insulation material used on the truck must have a resistance of a least 190 000 ohms (190 kohms).

Testing against the body - figures 1, 2, 3, 5 and 6

Testing armature and stator against field winding - figures 4 and 7
Check armature and stator of both drive motor and generator and associated leads in the circuit.
The test should be carried out by applying a d.c. voltage of 500 volts at the minimum. The megger (e.g. Isolavi 8) used for checking for earthing must supply a current rating of at least 1 mA.



Keyswitch S1

Located on the RH section of the dash panel on the steering column, keyswitch S1 is operated with a removable key to prevent unauthorised use of the truck.

The keyswitch is used for starting the engine and operating the electrical equipment belonging to the engine.

The keyswitch incorporates a starter safeguard lock preventing the key from being turned to the „START“ position once the engine has started.

It is only after the key has been turned to the ‘OFF’ position and the engine has stopped turning that a second attempt to start the engine can be made.

The keyswitch has 3 positions:

0 = ‘OFF’ . 1 = ‘ON’ , 2 = ‘START’
(key turned clockwise)

When released from the ‘START’ position the keyswitch will automatically return to the ‘ON’ position.

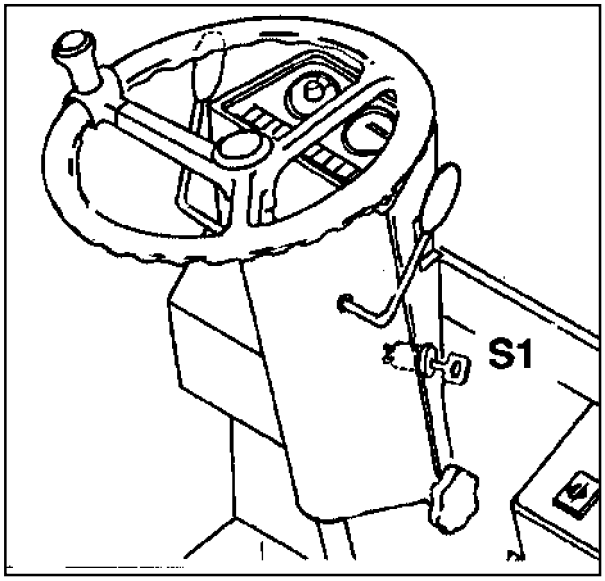
The keyswitch has 3 connections on its reverse:

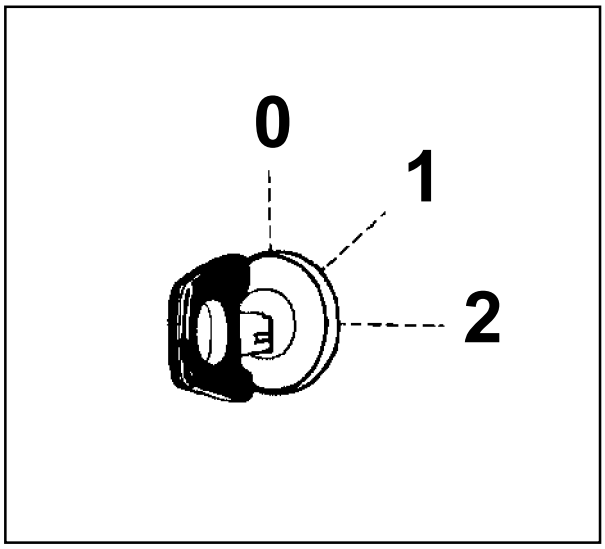
30/S1 supply line from pos. (+) battery terminal (24 volts)
50/S1 p.c.b. 9A4 ‘engine starting via generator’ supplied with battery voltage in ‘START’position of keyswitch
15/S1 the electrical system is supplied with battery voltage in ‘START’ and ‘ON’ position of keyswitch

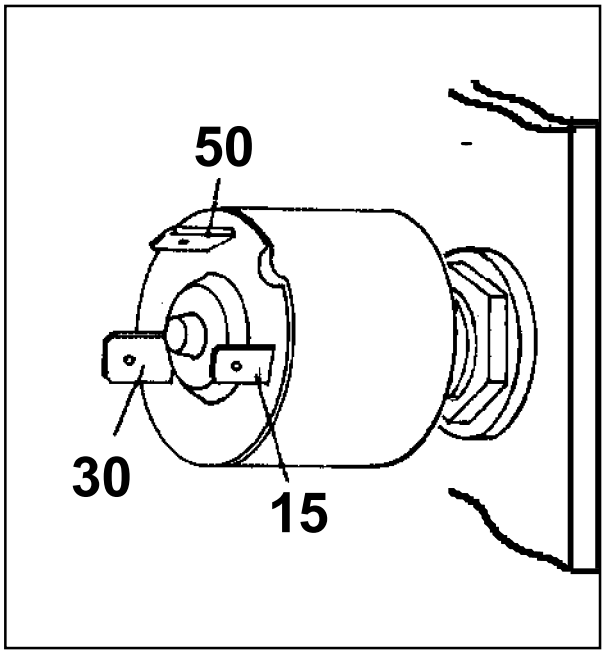
Starting
The starting operation can only be carried out with directional control lever in neutral and engine completely stopped. The engine will start with a delay of around 1 sec.

The rieutral position is indicated by indicator light H3. Indication of ‘preglow’ is by start indicator lamp 6H12 (diesel model).

Turning off the engine
Turn key S1 to the ‘OFF’ position.
The engine of LPG model will continue running until total consumption of residual gas quantity!
(see: relay 9K4).





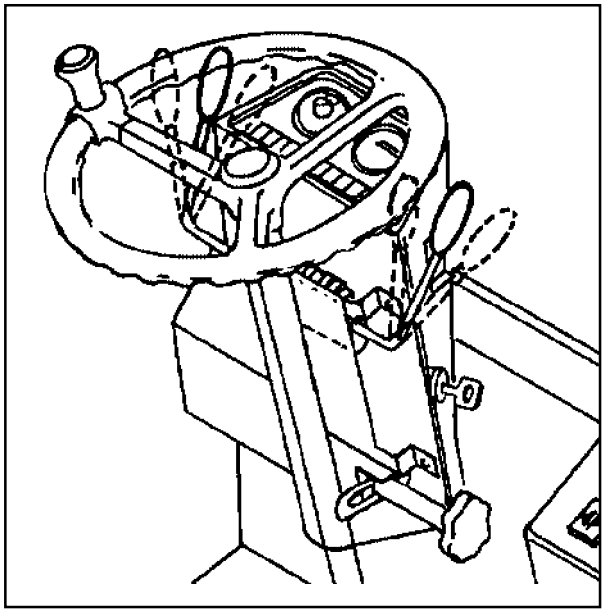


Directional control switches

Manual change of direction of travel
Well protected by the dash panel, the switch assembly controlling the direction of travel is mounted on a base plate welded to the steering column.

The double-type directional control lever is supported on a die-cast bracket. The direction switch can be switched to 3 positions:
„forwards“ - „neutral“ - „reverse“
The directional control lever is locked in the different spring-loaded positions by a notch and cam with roller. Arranged between the two bearing points of the bracket, a plastic switching segment on the direction control lever actuates the following waterproof microswitches (2):

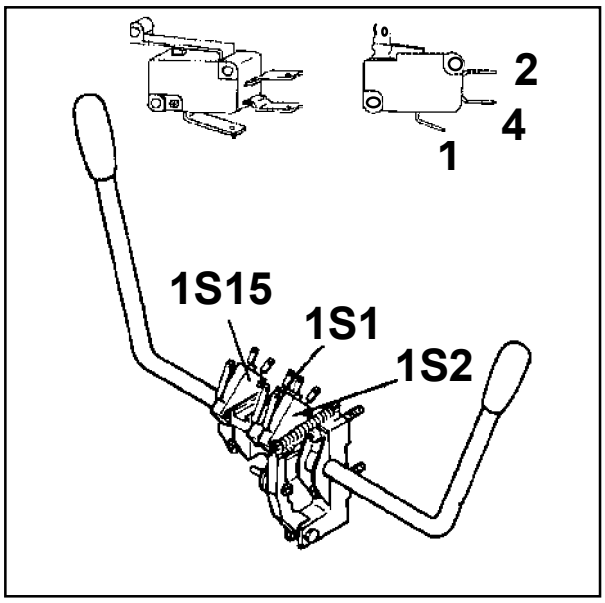
1S1	- forwards
1S2	- reverse
1S15	- neutral



Microswitches

Rest position: contact 1 - 2 closed
contact 1 - 4 open

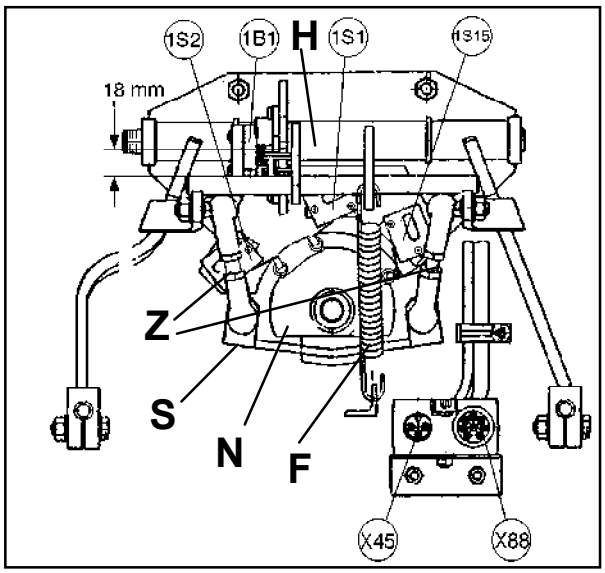
Note: Earlier models are fitted with standard microswitches that are not waterproof. Both microswitch designs are interchangeable.



Two-pedal control

(one pedal for each direction of travel)

The accelerator transmitter 1 Bl is operated by two pedals (one for forward travel, the other for reverse travel) mounted on a common shaft together with a lever (**H**).
This lever comprises a return spring (**F**) which ensures that both pedals upon being released automatically retum to the initial or rest position. The pedals are mechanically linked to a rocker (**S**) via control rods (**Z**). Located on the rocker and provided with appropriate notches, cam (**N**) operates the waterproof microswitches 1S1, 1S2, 1S15, causing them to actuate.
The control rods must be adjusted so that the stroke of the rocker ist 18 mm, pedal travel being 5 +/- 2 mm.



Microswitches
Rest position: contact 1 - 2 closed
contact 1 - 3 open